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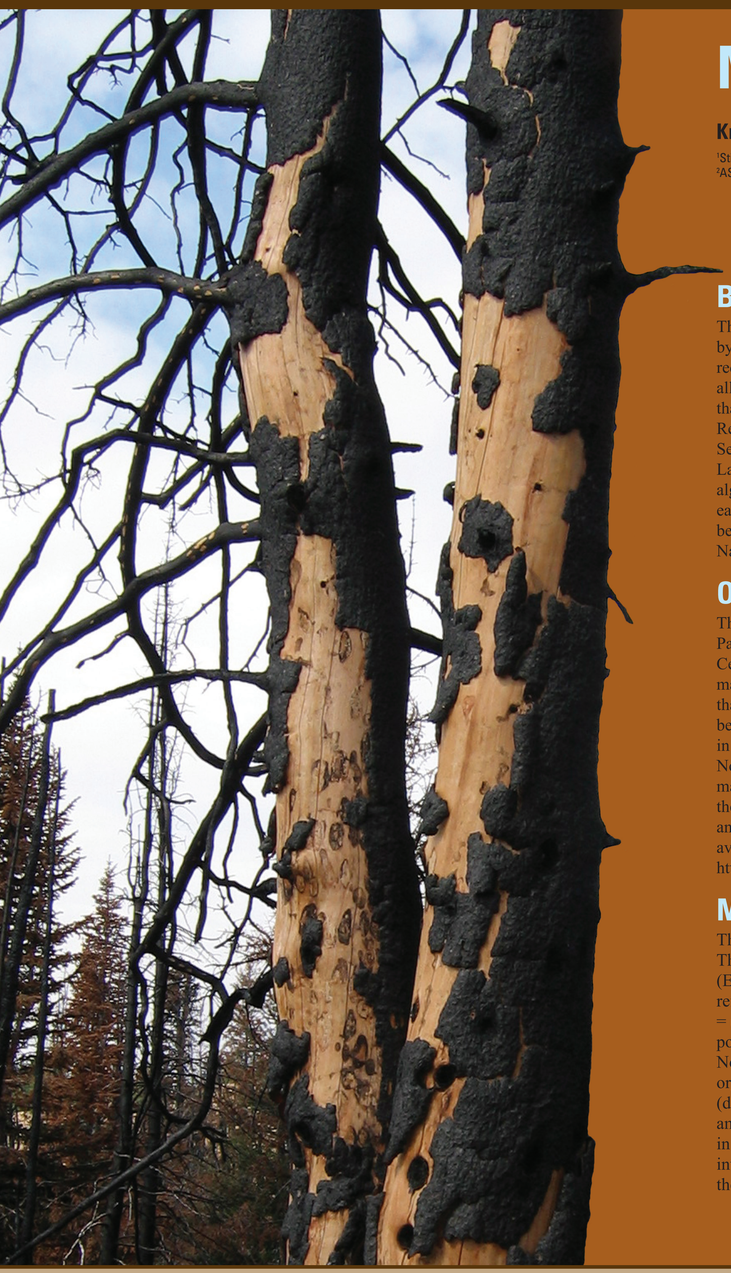
MTBS
Monitoring Trends in Burn Severity



Monitoring Trends in Burn Severity: Overview and Current Mapping Status

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Background

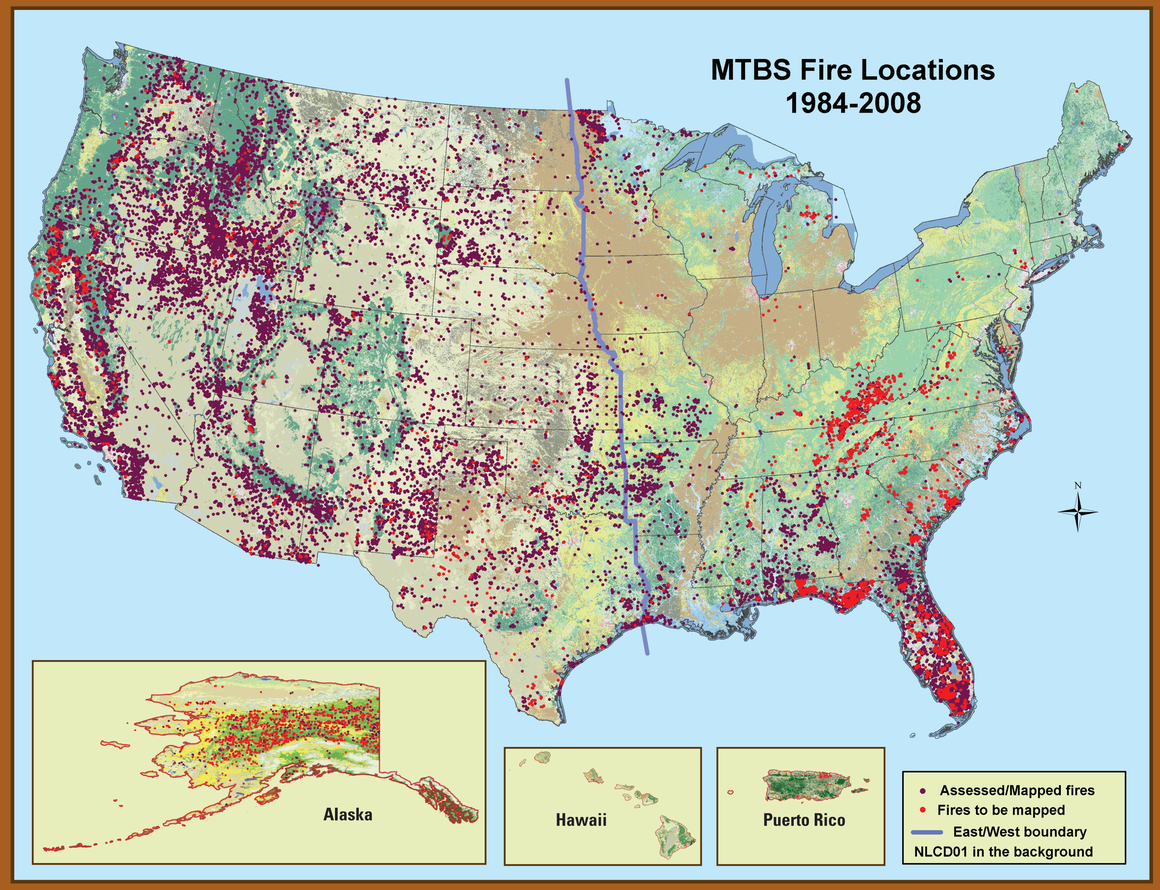
The Monitoring Trends in Burn Severity project (MTBS) is sponsored by the Wildland Fire Leadership Council (WFLC), and its fundamental requirement is to create a nationally consistent burn severity assessment for all large fires that have occurred in the United States since 1984. Sharing that responsibility and beginning in 2006, the US Geological Survey Earth Resources Observation and Science (EROS) Center and the USDA Forest Service Remote Sensing Applications Center (RSAC) have been using Landsat imagery and the differenced Normalized Burn Ratio (dNBR) algorithm to map burn severity for all fires greater than 500 acres in the eastern United States and 1,000 acres in the West. This information will be used to help determine national fire trends and the effectiveness of the National Fire Plan and the Healthy Forest Restoration Act.

Overview and Current Mapping Status

The MTBS project has divided the United States into 10 mapping zones: Pacific Northwest, Pacific Southwest, Southwest, North Central, South Central, Northeast, Southeast, Alaska, Hawaii, and Puerto Rico. In each mapping zone, historical and current fires are mapped. All candidate fires that occurred from 2004 through 2007 across the entire United States have been assessed. Additionally, the project has completed the historical fires in the following regions: Pacific Northwest, Pacific Southwest, Southwest, North Central, South Central, and Southeast. Over 9,900 fires have been mapped. Currently EROS and RSAC are working on the 2008 fires across the United States. Historical mapping for fires in the Northeast, Alaska, and Hawaii will be completed in 2010.Fires that have been completed are available for download at: http://mtbs.cr.usgs.gov/viewer/viewer.htm or http://mtbs.gov.

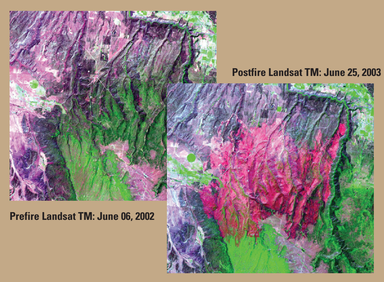
MTBS Methods

The MTBS project uses remotely sensed data from the Landsat 5 Thematic Mapper (TM) and Landsat 7 Enhanced Thematic Mapper Plus (ETM+) Sensors. These data are orthorectified and calibrated to at-sensor reflectance. A remote sensing model, the Normalized Burn Ratio {NBR = (Band 4 – Band 7)/(Band 4+ Band 7)}, is calculated for prefire and postfire images. A change detection process known as the differenced Normalized Burn Ratio (dNBR, Key and Benson 2006, http://www.fire.org/firemon) is used to compare the postfire scene to the prefire scene (dNBR = pre_NBR-post_NBR). The severity of the burn is related to the amount of change on the ground and vegetation loss that can be detected in the dNBR image. Burn severity thresholds are set for each fire by interpreting the dNBR image and other ancillary data. Then a 5-class color thematic burn severity map is generated.

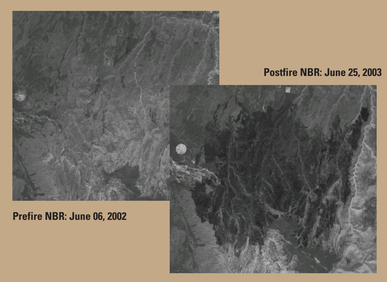


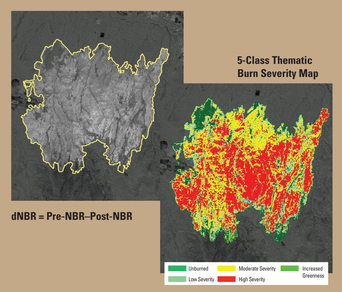
MTBS Burn Severity Assessment: Burn Canyon fire 2002, Uncompahgre National Forest, Colorado

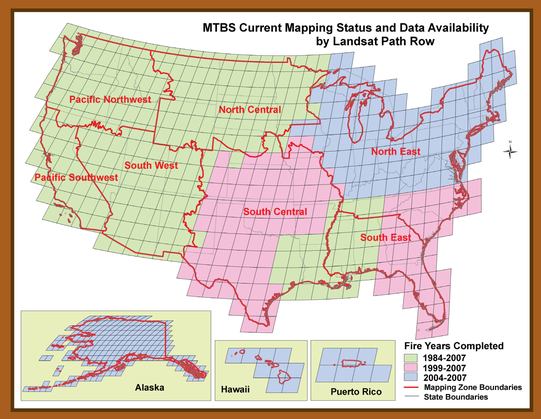
Landsat Scenes at-sensor reflectance (7, 4, and 3 bands)



Normalized Burn Ratio: NBR = (Band 4 – Band 7)/(Band 4+ Band 7)







The MTBS project collects fire locations across the United States from multiple federal and states agencies. These agencies include the USDA Forest Service, the Department of the Interior (National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and Fish and Wildlife Service), and individual states. All fire records are compiled and fires that meet MTBS criteria are extracted to the Fire Occurrence Database (FOD). It is not uncommon for land management agencies to report on the same fires. When this happens duplicate fire records are entered into the FOD. Using the fire information in the FOD, the MTBS project utilizes the Landsat archive to select appropriate images to map each fire. The FOD is available for download at: http://mtbs.gov/dataaccess.html

U.S. Department of the Interior
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